

I CLAIM:

- 5     1-4. (canceled)
5.     (currently amended) An assembled semiconductor device comprising:
- 10       a semiconductor chip including at least one bond pad having an attached metallic interconnection element, said element made of a material not capable of reflow during the attachment process;
- a substrate having at least one contact pad;
- said chip interconnection element attached to said substrate contact pad using an attachment alloy
- 15       comprising a ternary alloy of 60.3 to 62.5 weight percent tin, 36 to 38 weight percent lead, and approximately 1.5 to 1.7 weight percent silver.
6. (canceled)
7. (original) The device according to Claim 5 wherein said ternary
- 20       alloy comprises about 1.62 weight percent silver, about 36.95 weight percent lead, and about 61.43 weight percent tin.
8. (currently amended) A method for the assembly of a semiconductor device having fatigue-resistant interconnection
- 25       elements, comprising the steps of:
- providing a semiconductor chip having at least one solder bump comprising an alloy of about ten weight percent tin and about ninety weight percent lead;
- 30       providing a solder paste comprising tin and silver, said solder paste having a reflow temperature of about 221 °C, said bump alloy

having a melting temperature higher than said  
paste reflow temperature;  
bringing said solder bump in contact with said  
solder paste and immersing said bump partially in  
said paste;  
supplying thermal energy to reflow said solder paste  
at about 235 °C;  
controlling the amount of energy and time after said  
melting of said solder paste so that the molten  
paste dissolves a pre-determined amount of said  
solder bump to form a tin/lead/silver ternary  
alloy of about eutectic composition without  
melting said solder bump; and  
removing said thermal energy to cool said ternary  
alloy fillet and said bump.

9. (original) The method according to Claim 8 wherein said  
solder paste is a binary solder paste having a  
composition of 2 to 3 weight percent  
silver and 97 to 98 weight percent tin so that the  
formation of primary  $\text{Ag}_3\text{Sn}$  plates in said fillet is  
avoided.

10. (original) The method according to Claim 9 wherein said  
binary  
solder alloy paste has a composition of about 2.5  
weight percent silver and about 97.5 weight percent  
tin.

11. (original) The method according to Claim 8 wherein said  
solder paste is a ternary solder paste having up to 20  
weight percent lead, up to 3 weight percent silver, and  
the balance tin.

12. (original) The method according to Claim 8 wherein said  
bump alloy has a melting temperature higher than 275 °C.

13. (original) The method according to Claim 8 wherein said bump alloy comprises about 10 weight percent tin and about 90 weight percent lead.

5 14. (original) The method according to Claim 8 wherein said controlling of energy and time comprises a temperature above 176 °C for about 70 seconds.

10 15. (original) The method according to Claim 8 wherein said ternary alloy comprises about 1.62 weight percent silver, about 36.95 weight percent lead, and about 61.43 weight percent tin.

15

20

25

30